REMARKS

The applicants have carefully considered the official action mailed on January 8, 2008, and the references cited therein. By way of the foregoing amendments, claims 1-3, 5-9, 13, 15, 17-19, 21-25, 29, 31, 33-35, 37-41, 45 and 47 have been amended. No new matter has been added. Accordingly, claims 1-49 are pending and at issue in this application. Reconsideration of this application is respectfully requested in view of the foregoing amendments and the following remarks.

As an initial matter, the applicants wish to thank Examiner Nasser for the telephonic interview conducted with the undersigned attorney on May 8, 2008. During the interview, the applicants discussed the foregoing amendments to claim 1. Examiner Nasser indicated that the foregoing amendments to claim 1 appeared to overcome the art of record.

With regard to the rejection of claims 16, 32 and 48 under 35 U.S.C. §112, first paragraph, as failing the enablement requirement, the applicants respectfully submit that one of skill in the art would have been enabled at the time of the invention to make and use the invention recited in these claims without undue experimentation. The applicants note that at least paragraph 84 of the present application describes using an exhaustive search method to identify frequency band choices that provide the highest correlation, a process that could easily be automated by one of ordinary skill in the art upon reading paragraph 84. In other words, the applicants respectfully submit that automatically searching a database including frequency band information and correlation coefficient information for frequency bands providing the highest correlation(s) would certainly not entail undue experimentation.

Turning to the art-based rejections, independent claim 1 now recites a method of detecting a change in a vascular condition involving processing data associated with a

plurality of cardiac cycles to determine a spectral characteristic for each of a plurality of frequencies within a frequency band for a first group of the cardiac cycles associated with a current state of the vascular condition and a second group of the cardiac cycles associated with an earlier state of the vascular condition. Additionally, the method involves detecting the change in the vascular condition based on a comparison between the acoustic characteristic associated with the current state of the vascular condition and an acoustic characteristic associated with the earlier state of the vascular condition, wherein the comparison comprises calculating a difference between each of the spectral characteristics at each of the frequencies for the first group of the cardiac cycles and the spectral characteristic at the corresponding frequency for the second group of the cardiac cycles.

Chassaing et al. generally describe a non-invasive turbulent blood flow imaging system that uses a beamforming approach to detect abnormal blood flow in patients. However, the system described by Chassaing et al. does not calculate a difference between each of the spectral characteristics at <u>each of the frequencies</u> for the first group of the cardiac cycles and the spectral characteristic <u>at the corresponding frequency</u> for the second group of cardiac cycles, as recited in claim 1. Instead, the cardiac cycle processing described by Chassaing et al. computes, for each of a plurality of cardiac cycles associated with a pre-intervention state, a first total energy for a plurality of frequencies across a first frequency band and second total energy for a second plurality of frequencies across a second frequency band (spectrally separate from the first frequency band). Then, for each cardiac cycle, the first and second total energies are linearly combined into a single classifier output, and the classifier outputs for the cardiac cycles are then averaged. The foregoing process is repeated for a post-intervention state and a difference between the average classifier outputs for the

pre-intervention and post-intervention states is used to determine a change in a patient's coronary artery condition.

In contrast to the presently claimed invention, the technique described by Chassaing et al. never calculates a spectral difference between first and second vascular states at a particular frequency, much less for a plurality of particular frequencies across a frequency band. Rather, Chassaing et al. teach that any spectral information obtained in connection with a particular frequency is to be combined with other spectral information for numerous other frequencies and that any spectral change analysis is to be performed using such combined spectral information (e.g., a difference of average classifier outputs).

While the technique described by Chassaing et al. may be useful to detect gross changes in acoustic power within multiple frequency bands for relatively large arteries (e.g., a coronary artery) that have undergone relatively large stenosis changes, such a technique has substantially less diagnostic power than the method recited in claim 1. Using the method recited in claim 1 provides spectral differences at each of a plurality of frequencies within a frequency band for at least first and second vascular states. Thus, the method recited in claim 1 can be used to provide a difference spectrum, which can be further processed using, for example, RMS and tRMS calculations that enable detection of gross spectral changes such as a significant energy change across a band of frequencies as well as difficult to detect redistributions of energy within the band of frequencies. The technique described by Chassaing et al. would simply not be able to detect a redistribution of energy within the frequency bands from which it collects spectral data because Chassaing et al. only look at total energies with those bands that are further linearly combined with one another. Thus, any information relating to redistribution of energy among particular frequencies within the bands is simply lost by the technique taught by Chassaing et al. As a result, the method

recited in claim 1 may be used to provide a remarkable improvement in the detection of a change in a vascular condition due, at least in part, calculating spectral differences between each of the frequencies at different states of a vascular condition. Such remarkable improvements are set forth in a paper submitted in the information disclosure statement filed herewith.

The remaining cited art fails to overcome the above-noted deficiencies of Chassaing et al. Accordingly, for at least the foregoing reasons, claim 1 and all claims dependent thereon are believed be in condition for allowance. The remaining pending claims are also believed to be in condition for allowance for at least the reasons set forth above in connection with claim 1.

For at least the foregoing reasons, the applicants respectfully submit that all pending claims are in condition for allowance. The examiner is urged to call the undersigned attorney at the number listed below if there are any remaining issues in this application.

The Commissioner is hereby authorized to charge any deficiency in the amount enclosed or any additional fees which may be required during the pendency of this application under 37 CFR 1.16 or 1.17 to Deposit Account No. 50-2455.

Respectfully submitted,

Hanley, Flight & Zimmerman, LLC
Suite 2100
150 S. Wacker Drive
Chicago, Illinois 60606
(312) 580-1020

By: /Mark G. Hanley/
Mark G. Hanley
Registration No. 44,736

May 12, 2008